SAE Aerospace An SAE International Group	AEROSPACE 航天 MATERIAL 材料 SPECIFICATION 规范	SAE	AMS 4919F
		Issued 发行 APR 四月 1978 Revised修订 SEP 九月 2006 Superseding 取代 AMS 4919E	

Titanium Alloy Sheet, Strip, and Plate
6Al - 2Sn - 4Zr - 2Mo - 0.08Si
Duplex Annealed
钛合金薄板，带材和板材
6 铝-2 锡-4 锆-2 钼-0.08 硅
双重退火

RATIONALE

基本原理

AMS 4919F is an update of the specification for annealing time tolerances.

AMS 4919F是退火时间公差规范的更新。

1. SCOPE范围

1.1 Form形式

This specification covers a titanium alloy in the form of sheet, strip, and plate.

本规范涵盖了薄板，带材和板材形式的钛合金。

1.2 Application应用

These products have been used typically for parts requiring a combination of high strength and toughness and good creep resistance up to 1000 °F (538 °C) but usage is not limited to such applications.

这些产品通常用于需要高强度和高韧性以及高达1000°F（538°C）的良好抗蠕变性的部件，但用途不限于此类应用。

1.2.1 Certain processing procedures and service conditions may cause these products to become subject to stresscorrosion cracking; ARP982 recommends practices to minimize such conditions.

某些加工程序和服务条件可能导致这些产品受到应力腐蚀开裂; ARP982建议尽量减少这种情况。

1.3 Classification分类

Class 1 - Ultrasonic Test Periodically

Class 2 - Ultrasonic Testing is an acceptance test.

Class 1 shall be supplied unless Class 2 is specified

1类 - 超声波测试定期

2类 - 超声波测试是一种验收测试。

除非指定2类，否则应提供1类

2. APPLICABLE DOCUMENTS: 规范性引用文件：

The issue of the following documents in effect on the date of the purchase order form a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

在采购订单的日期生效的以下文件的问题在本文规定的范围内构成本规范的一部分。 供应商可以工作到文档的后续修订，除非指定了具体的文档问题。 当参考文件被取消，并且没有指定替代文件时，该文件的最后出版的问题将适用。

2.1 SAE Publications: SAE出版物：

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, or, www.sae.org.

可从SAE，400 Commonwealth Drive，Warrendale，PA 15096-0001或www.sae.org获得。

AMS 2242 Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet,Strip, and Plate

AMS 2249 Chemical Check Analysis Limits, Titanium and Titanium Alloys

AMS 2631 Ultrasonic Inspection, Titanium and Titanium Alloy, Bar and Billet

AMS 2750 Pyrometry

AMS 2809 Identification, Titanium and Titanium Alloy Wrought Products

ARP982 Minimizing Stress-Corrosion Cracking in Wrought Titanium Alloy Products 2.2 ASTM

AMS 2242公差，耐腐蚀和耐热钢，铁合金，钛和钛合金板材，带和板

AMS 2249化学检测分析极限，钛和钛合金

AMS 2631超声波检测，钛和钛合金，棒材和方坯

AMS 2750高温测定法

AMS 2809标识，钛合金和钛合金锻造产品

ARP982减少锻造钛合金产品的应力腐蚀开裂

2.2 ASTM出版物可从ASTM International，100 Barr Harbor Drive，P.O. Box C700，West Conshohocken，PA 19428-2959，电话：610-832-9585，www.astm.org金属材料拉伸试验

ASTM E 8 Tension Testing of Metallic Materials

ASTM E 21 Elevated Temperature Tension Tests of Metallic Materials

ASTM E 290 Bend Testing of Material for Ductility

ASTM E 384 Microindentation Hardness of Materials

ASTM E 1409 Determination of Oxygen and Nitrogen in Titanium and Titanium Alloys by the Inert Gas FusionTechnique

ASTM E 1447 Determination of Hydrogen in Titanium and Titanium Alloys by the Inert Gas Fusion ThermalConductivity/Infrared Detection Method

ASTM E 1941 Standard Test Method for Determination of Carbon in Refractory and Reactive Metals and Their Alloys

ASTM E 2371 Standard Test Method for Analysis of Titanium and Titanium Alloys by Atomic Emission Plasma Spectrometry

ASTM E 8金属材料拉伸试验

ASTM E 21金属材料高温拉伸试验

ASTM E 290弯曲试验材料的延展性

ASTM E 384材料的微压痕硬度

ASTM E 1409用惰性气体熔合技术测定钛和钛合金中的氧和氮

ASTM E 1447惰性气体融合热导率/红外检测法测定钛和钛合金中的氢

ASTM E 1941测定难处理和反应性金属及其合金中碳的标准试验方法

ASTM E 2371用原子发射等离子体光谱法分析钛和钛合金的标准试验方法

3. TECHNICAL REQUIREMENTS: 技术要求：

3.1 Composition 组成：

应符合表1所示的重量百分比; 碳应根据ASTM E1941测定，氢根据ASTM E 1447测定，氧和氮根据ASTM E 1409测定，其它元素根据ASTM E 2371测定。如果购买者可接受，可以使用其他分析方法。

TABLE 1 – COMPOSITION 表1-组合物

中国	Element 元素	Min 最小值	Max 最大值
Al	Aluminum	5.50	6.50
Zr	Zirconium	3.60	4.40
Mo	Molybdenum	1.80	2.20
Sn	Tin	1.80	2.20
Si	Silicon	0.06	0.10
O	Oxygen	--	0.25
Fe	Iron	--	0.12
C	Carbon	--	0.05
Ni	Nitrogen	--	0.05 （500ppm）
H	Hydrogen (3.1.3)	--	0.0150（150ppm）
Y	Yttrium (3.1.1)	--	0.005 （50 ppm）
单个	Residual Elements, each (3.1.1)	--	0.10
总和	Residual Elements, total (3.1.1)	--	0.30
钛	Titanium	remainder 余	

3.1.1 Determination not required for routine acceptance常规验收不需要确定

3.1.2 Check Analysis Composition variations shall meet the applicable requirements of AMS 2249. 检查分析成分变化应符合AMS 2249的适用要求

3.1.3 For hydrogen analysis conducted in accordance with ASTM E 1447, sample size may be as large as 0.35 gram. 对于根据ASTM E 1447进行的氢分析，样品大小可能高达0.35克。

3.2 Quality质量

3.2.1 Alloy shall be multiple melted. The first melt shall be by consumable electrode, nonconsumable electrode, electron beam cold hearth, or plasma arc cold hearth melting practice. The final melting cycle shall be made using vacuum arc remelting (VAR) with no alloy additions permitted. 合金应多次熔化。第一次熔化应采用消耗电极，非消耗电极，电子束冷床或等离子弧冷床熔炼实践。最终的熔炼周期应使用真空电弧重熔（VAR）进行，不允许添加合金。

3.2.1.1 The atmosphere for nonconsumable electrode melting shall be vacuum or shall be inert gas at a pressure not higher than 1000 mm of mercury. 非消耗性电极熔化的气氛应为真空或在不高于1000毫米汞柱的压力下为惰性气体。

3.2.1.2 The electrode tip for nonconsumable electrode melting shall be water-cooled copper. 非消耗性电极熔化的电极头应采用水冷铜

3.3 Condition条件

The product shall be supplied in the following condition: 产品应按以下条件供货

3.3.1 Sheet and Strip 薄板和带材

Hot rolled with or without subsequent cold reduction, duplex annealed, descaled, and leveled, having a surface appearance comparable to a commercial corrosion-resistant steel No. 2D finish (See 8.2).

经过或不经过后续的冷轧，双重退火，去皮和平整的热轧，其表面外观可与商业耐腐蚀钢No.2D完成相比（见8.2）。

3.3.2 Plate 板材

Hot rolled, duplex annealed, descaled, and flattened, having a surface appearance comparable to a commercial corrosionresistant steel No. 1 finish (See 8.2).

热轧，双面退火，去皮和平整，表面外观可与商业耐腐蚀钢No.1涂层相媲美（见8.2）。

3.4 Heat Treatment热处理

The product shall be duplex annealed as follows; pyrometry shall be in accordance with AMS 2750 产品应按如下进行双面退火；高温测定应符合AMS 2750

3.4.1 Product under 0.1875 inch (4.762 mm) in nominal thickness shall be heated to 1650 °F ± 25 (899 °C ± 14), held at heat for 30 minutes cooled in air to room temperature, reheated to 1450 °F ± 25 (788 °C ± 14), held at heat for 15 minutes, and cooled in air to room temperature. 公称厚度0.1875英寸（4.762毫米）以下的产品应加热至1650°F±25（899°C±14），保温30分钟，在空气中冷却至室温，再加热至1450°F± 25（788℃±14），加热15分钟，并在空气中冷却至室温。

3.4.2 Product 0.1875 inch (4.762 mm) and over in nominal thickness shall be heated to 1650 °F ± 25 (899 °C ± 14), held at heat for 60 minutes, cooled in air to room temperature, reheated to 1100 °F ± 25 (593 °C ± 14), held at heat for 8 hours, and cooled in air to room temperature. 0.1875英寸（4.762毫米）及以上标称厚度的产品应加热至1650°F±25（899°C±14），保温60分钟，空气冷却至室温，再加热至1100°F±25（593℃±14），保温8小时，并在空气中冷却至室温。

3.4.3 Heat treating time tolerances shall be commensurate with heating equipment and procedure used, to produce product meeting the requirements of Para. 3.5. 热处理时间公差应与加热设备和使用的程序相匹配，以生产符合本部分要求的产品参见3.5。

3.5 Properties: 属性

The product shall conform to the following requirements:

产品应符合以下要求：

3.5.1 Tensile Properties (See 8.3) 拉伸性能（见8.3）

3.5.1.1 At Room Temperature 在室温下

Shall be as specified in Table 2, determined in accordance with ASTM E 8 on specimens as in 4.3.1.2.1 from product 0.025 to 3.000 inches (0.64 to 76.20 mm), inclusive, in nominal thickness, with the rate of strain maintained at 0.003 to 0.007 inch/inch/minute (0.003 to 0.007 mm/mm/minute) through the yield strength and then increased so as to produce failure in approximately one additional minute. When a dispute occurs between purchaser and vendor over the yield strength values, a referee test shall be performed on a machine having a strain rate pacer, using a rate of 0.005 inch/inch/minute (0.005 mm/mm/minute) through the yield strength and a minimum crosshead speed of 0.10 inch (2.5mm) per minute above the yield strength. 应符合表2的规定，根据ASTM E8的规定，如4.3.1.2.1所述，标称厚度为0.025至3.000英寸（0.64至76.20 mm）（含）的试样，应变速率保持在 0.003至0.007英寸/英寸/分钟（0.003-0.007mm / mm /分钟），然后增加，从而在约一分钟内产生故障。 当买卖双方对屈服强度值发生争议时，应在具有应变速率起搏器的机器上进行裁判员测试，在0.005英寸/分钟/分钟（0.005mm / mm /分钟）强度和0.10英 （2.5毫米）/分钟以上屈服强度以下的最小十字头速度。

TABLE 2A - MINIMUM TENSILE PROPERTIES, INCH/POUND UNITS

表2A-最小拉伸性能，英寸/磅单位

Nominal Thickness Inches公称厚度 英寸	Tensile Strength ksi 抗拉强度 KSI	Yield Strength at 0.2% Offset ksi屈服强度在0.2%的偏移量 KSI	Elongation in 2 Inches or 4D% 伸长在2英寸或4D%
0.025 to 0.062, incl0.025至0.062，包含	135	125	8
Over 0.062 to 1.000, incl超过0.062至1.000，包含	135	125	10
Over 1.000 to 3.000, incl超过1.000至3.000，包含	130	120	10

TABLE 2B - MINIMUM TENSILE PROPERTIES, SI UNITS

表2B - 最小拉伸性能，SI单位

Nominal Thickness Millimeters公称厚度 毫米	Tensile Strength MPa抗拉强度 兆帕	Yield Strength at 0.2% Offset MPa屈服强度在0.2%的偏移量 兆帕	Elongation in 2 Inches or 4D %伸长在2英寸或4D %
0.64 to 1.57, incl0.64至1.57，（包含）	931	862	8
Over 1.57 to 25.40, incl超过1.57至25.40（包含）	931	862	10
Over 25.40 to 76.20, 超过25.40至76.20 incl（包含）	896	827	10

3.5.1.2 At 900 °F (482 °C)

Shall be as specified in Table 3 for product 0.025 to 3.000 inch (0.64 to 76.20 mm), inclusive, in nominal thickness, determined in accordance with ASTM E 21 on specimens as in 4.3.1.2.1 heated to 900 °F ± 10 (482 °C ± 6), held at heat for 20 to 30 minutes before testing, and tested at 900 °F ± 10 (482 °C ± 6) using strain rates as specified in 3.5.1.1.

3.5.1.2在900°F（482°C）

按照表3规定，对于产品0.025至3.000英寸（0.64至76.20毫米）（包括端值），标称厚度，根据ASTM E21对4.3.1.2.1中的试样进行测定，加热至900°F±10 482℃±6），保温测试前20至30分钟，并使用3.5.1.1规定的应变速率在900°F±10（482°C±6）下测试。

TABLE 3A - MINIMUM TENSILE PROPERTIES, INCH/POUND UNITS

表3A - 最小拉伸性能，英寸/磅单位

Nominal Thickness Inches公称厚度 英寸	Tensile Strength ksi抗拉强度 KSI	Yield Strength at 0.2% Offset ksi屈服强度 在0.2%的偏移量 KSI	Elongation in 2 Inches or 4D %伸长 在2英寸或4D %
0.025 to 0.062, incl0.025至0.062，包括	95	75	7
Over 0.062 to 2.000, incl超过0.062至2.000，包括	95	75	10
Over 2.000 to 3.000, incl超过2.000至3.000，包括	90	70	10

TABLE 3B - MINIMUM TENSILE PROPERTIES, SI UNITS

表3B - 最小拉伸性能，国际单位制

Nominal Thickness Millimeters公称厚度 毫米	Tensile Strength MPa抗拉强度 兆帕	Yield Strength at 0.2% Offset MPa屈服强度 在0.2%的偏移量 兆帕	Elongation in 2 Inches or 4D %伸长 在2英寸或4D %
0.64 to 1.57, incl0.64至1.57，含	655	517	7
Over 1.57 to 50.80, incl超过1.57至50.80，含	655	517	10
Over 50.80 to 76.20, incl超过50.80至76.20，含	621	483	10

3.5.2 Bending 弯曲

Product under 0.1875 inch (4.762 mm) in nominal thickness shall have a test sample prepared nominally 0.750 inch (19.06mm) in width, with its axis of bending parallel to the direction of rolling. The sample shall be bend tested at room temperature in conformance with the guided bend test defined in ASTM E 290 through an angle of 105 degrees. The test fixture supports shall have a contact radius 0.010 minimum, and the plunger shall have a diameter equal to the bend factor shown in Table 4 times the nominal thickness. Examination of the bent sample shall show no evidence of cracking when examined at 15 to 25X magnification.

在标称厚度0.1875英寸（4.762毫米）以下的产品应该有一个标称宽度为0.750英寸（19.06毫米）的试样，其弯曲轴线平行于轧制方向。 样品应在室温下弯曲测试，符合ASTM E 290中定义的导向弯曲测试，角度为105度。 测试夹具支架的接触半径应至少为0.010，柱塞的直径应等于表4中标称厚度的弯曲系数。 在15至25X放大率下检查时，弯曲样品的检查应显示无裂纹证据。

TABLE 4 - BEND FACTOR

表4 - 弯曲因子

Nominal Thickness Inch公称厚度 英寸	Nominal Thickness Millimeters公称厚度 毫米	Bend Factor弯曲因子
Up to 0.070, incl高达0.070，含	Up to 1.78, incl高达1.78，含	9
0.070 to 0.1875, excl0.070至0.1875，不包含	1.78 to 4.762, excl1.78至4.762，不含	10

3.5.3 Microstructure

Shall be that structure resulting from alpha-beta processing. Microstructure shall conform to 3.5.3.1, 3.5.3.2, or 3.5.3.3.

3.5.3.1 Equiaxed and/or elongated primary alpha in a transformed beta matrix with no continuous network of alpha at prior beta grain boundaries.

3.5.3.2 Essentially complete field of equiaxed and/or elongated alpha with no continuous network of alpha at prior beta grain boundaries.

3.5.3.3 Partially broken and distorted grain boundary alpha with plate-like alpha.

3.5.3.4 A microstructure showing a continuous network of alpha in prior beta grain boundaries is not acceptable.

3.5.3微观结构

应该是由α-β处理产生的那种结构。 微观结构应符合3.5.3.1,3.5.3.2或3.5.3.3的规定。

3.5.3.1等轴和/或拉长的初级α在转化的β基质中，在前β晶界处没有连续的α网络。

3.5.3.2基本上完整的等轴和/或伸长的α场，在前β晶界处没有连续的α网络。

3.5.3.3具有板状α的部分破碎和扭曲的晶界α。

3.5.3.4在先前的β晶界中显示α连续网络的微观结构是不可接受的。

3.5.4 Surface Contamination 表面污染

The product shall be free of any oxygen-rich layer, such as alpha case, or other surface contamination, determined as in 3.5.4.1 or 3.5.4.2, or other method agreed upon by purchaser and vendor. Isolated local areas of alpha case are acceptable on plate.

产品不应含有如3.5.4.1或3.5.4.2中所确定的任何富氧层，如阿尔法或其他表面污染物，或采购方和供应商同意的其他方法。板材上可以接受孤立的阿尔法案例。

3.5.4.1 The bend test of 3.5.2. 3.5.2的弯曲试验。

3.5.4.2 Hardness differential; a surface hardness more than 40 points higher than the subsurface hardness, determined in accordance with ASTM E 384 on the Knoop scale using a 200-gram load, is evidence of unacceptable surface contamination.

硬度差异；根据ASTM E 384使用200克载荷在努氏等级上测定的表面硬度比表面下硬度高40多点的表面硬度是不可接受的表面污染的证据。

3.6 Quality

The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from oil cans (See 8.4.1)of depth in excess of the flatness tolerances, ripples, foreign

materials, and from imperfections detrimental to usage of the product.
买方收到的产品在质量和条件上，声音均匀一致，不存在油罐（这里这个油罐指的是一种现象，见8.4.1），其深度超过平面度公差，波纹，异物和缺陷，不利于使用该产品。
3.6.1 Plate 0.500 to 3.000 inches (12.70 to 76.20 mm), inclusive, in nominal thickness, ultrasonically inspected in accordance with AMS 2631, shall meet the Class A1 requirements of AMS 2631 按标准AMS 2631进行超声波检验的标称厚度为0.500至3.000英寸（12.70至76.20毫米）（包括端值）的板应符合AMS 2631

3.7 Tolerances 公差
Shall conform to the following: 应符合以下要求
3.7.1 Thickness, Width, Length, and Straightness 厚度，宽度，长度和直线度
All applicable requirements of AMS 2242. AMS 2242的所有适用要求。
3.7.2 Flatness 平坦度
Flatness tolerance for product 36 inches (914 mm) and under in width shall be 5% if nominal thickness is under 0.025 inch(0.64 mm) and 3% if nominal thickness is 0.025 to 0.1875 inch (0.64 to 4.762 mm), exclusive. Flatness tolerance for product under 0.1875 inch (4.762 mm) in nominal thickness and over 36 inches (914 mm) wide and for product 0.1875 inch (4.762 mm) and over in thickness in all widths shall be as agreed upon by purchaser and vendor.
如果名义厚度低于0.025英寸（0.64毫米），36英寸（914毫米）和低于宽度的产品的平坦度公差应为5％，如果公称厚度为0.025至0.1875英寸（0.64至4.762毫米），则为3％。 产品在0.1875英寸（4.762毫米）公称厚度和超过36英寸（914毫米）宽以及0.1875英寸（4.762毫米）以上且所有宽度厚度以上的产品的平面度公差应由买方和供应商商定。
3.7.2.1 Flatness shall be determined from the expression 100H/L where “H” is the distance from the straight edge to the product at the point of greatest separation and “L” is the distance between contact points of a straight edge laid in any direction on the product.
平直度应根据100H / L表达式确定，其中“H”是在最大分离点处从直边到产品的距离，“L”是任何直边的接触点之间的距离 产品上的方向。
3.7.2.2 Flatness tolerances do not apply to coiled products. 平直度公差不适用于卷绕产品。

4 QUALITY ASSURANCE PROVISIONS: 质量保证条款：

4.1 Responsibility for Inspection 质量检测
The vendor of the product shall supply all samples for vendor’s test and shall be responsible for the performance of all required test. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the products conforms to the specified requirements.
产品的供应商应提供所有样品供应商的测试，并负责所有要求的测试的性能。 买方保留采样和进行任何认为必要的确认测试的权利，以确保产品符合规定的要求。
4.2 Classification of Tests 检测项目
4.2.1 Acceptance Tests 验收测试
Composition (3.1), condition (3.3), room-temperature tensile properties (3.5.1.1), bending (3.5.2), microstructure (3.5.3),surface contamination (3.5.4), ultrasonic testing when Class 2 is specified (3.6.2), and tolerances (3.7) are acceptance tests and shall be performed on each heat or lot as applicable. 组分（3.1），条件（3.3），室温拉伸性能（3.5.1.1），弯曲（3.5.2），微观结构（3.5.3），表面污染（3.5.4），指定第2类时的超声波测试 （3.6.2）和公差（3.7）是

验收测试，并应适用于每个热源或批次。

4.2.2 Periodic Tests 定期测试

900 °F (482 °C) tensile properties (3.5.1.2) and ultrasonic soundness (3.6.2) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser. 900°F（482°C）拉伸性能（3.5.1.2）和超声波稳固性（3.6.2）是定期测试，除非买方指定测试频率，否则应按供应商选择的频率进行。

4.3 Sampling and Testing 取样与检测

Shall be accordance with following: a lot shall be all product of the same nominal size from the same heat processed at the same time.

取样检测须遵守以下规则：一批指同一时间段内加工的的同一热处理条件下的同一规格尺寸的产品。

4.3.1 For Acceptance Tests: 验收检测

4.3.1.1 Composition组成

One sample from each heat, except that for hydrogen determinations one sample from each lot obtained after thermal andchemical processing is completed. 来自每次加热的一个样品，除了用于氢气测定之外，在热化学加工完成之后获得的每批样品中有一个样品。

4.3.1.2 Tensile Property, Bending, Microstructure, and Surface Contamination Requirements 拉伸性能，弯曲，微观结构和表面污染要求

At least one sample from each lot. 每批至少有一个样品

4.3.1.2.1 Specimens for tensile tests of widths 9 inches (229 mm) and over shall be taken with the axis of the specimen perpendicular to the direction of rolling; for widths under 9 inches (229 mm), specimens shall be taken with the axis parallel to the direction of rolling. 宽度为9英寸（229毫米）及以上的拉伸试验样品应取与试样轴垂直于轧制方向；对于9英寸（229毫米）以下的宽度，试样的取向应与轴线平行于轧制方向。

4.4 Reports: 检测报告

The vendor of the product shall furnish with each shipment a report showing the results of tests for composition of each heat and for hydrogen content, tensile properties, bending, and surface contamination of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 4919F, size, and quantity. 产品的供应商应向每批货物提供一份报告，说明每种热量的成分以及每批产品的氢含量，拉伸特性，弯曲和表面污染的测试结果，并说明产品符合其他技术要求。 该报告应包括采购订单号，热量和批号，AMS 4919F，尺寸和数量。

4.5 Resampling and Retesting:重新取样及复验

If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented. Result of all tests shall reported.

如果用于上述测试的样本有任何一个试样不符合规定要求，则另外取三个额外的试样检测。三个额外试样有任何一个试样不符合要求则采购方可拒收该试样代表的那批产品。所有检测结果均须报告。

5. PREPARATION FOR DELIVERY:交货准备

5.1 Identification:产品鉴定

Shall be in accordance with AMS 2809. 应符合 AMS 2809。

5.2 Packing:包装

The product shall be prepared for shipment in accordance with commercial practice and in compliance rules and regulations pertaining to the handing, packing, and transportation of the product to ensure carrier acceptance and safe delivery.

产品应该按照商业惯例做好装运准备，并且使其符合规定，适于吊运、包装、搬运，以确保能够安全运输。

6. ACKNOWLEDGEMENT:确认

A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

确认订单时，供货方应在所有报价单上注明本标准编号以及版次。

7. REJECTIONS:拒收

Product not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

产品不符合要求或者经采购方同意修补之后仍不符合要求的，可拒收。

8. NOTES:注释说明

8.1 A change bar(I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this specification. An(R) symbol to the left of the document title indicates a complete revision of the specification, including technical revision. Change bars and(R) are not used in original publications, nor in specifications that contain editorial changes only.

标准左边空白处的指示符“I”表明本标准对上一版本进行过技术性技术修改而不是编辑性修改。标准左边的“R”符符号表示本标准是完整版本，包括技术修订。指示符和“R”符号不会在原稿中出现，也不会出现在只进行编辑性修改的版本中。

8.2 Commercial corrosion-resistant steel finishes are defined in ASTM A 480/A 480M and AS4194. 商业耐腐蚀钢表面处理在 ASTM A 480 / A 480M 和 AS4194 中定义。

8.3 MMPDS rounded T_{99} values for tensile and yield strengths are higher than specification values herein. 拉伸强度和屈服强度的 MMPDS 舍入 T99 值高于本文的规定值。

8.4 Terms used in AMS are clarified in ARP1917 and as follows: AMS 中使用的术语在 ARP1917 中进行了说明，内容如下：

8.4.1 “Oil-Can”

An excess of material in a localized area of a sheet that causes the sheet to buckle in that area. When the sheet is placed on a flat surface and hand pressure applied to the buckle, the buckle will spring through to the opposite surface or spring up in another area of the sheet. 薄板材局部区域的材料过多，导致薄板材在该区域弯曲。 当薄板材放置在平坦表面上并且手压力施加到扣环上时，扣环将弹回到相反表面或在薄板材的另一区域弹起。

8.5 Terminology for titanium microstructure is presented in AS1814.

钛微结构的术语在 AS1814 中提出。